



P.O. Box 6421 Auburn, CA 95604

May 2015

<http://w6ek.org> info@w6ek.org

At The Key of SFARC:

PRESIDENT

Tyghé Richardson, KD6MLH
tyghe@tjrauctions.com

VICE PRESIDENT

Bob Brodovsky, K6UDA
k6uda@att.net

SECRETARY

Bruce Anderson, K6BAA
anderson51@wavecable.com

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Richard Kuepper, WA6RWS
rkuepper@surewest.net

DIRECTORS

Birton Gilbert, N6UG
Robert Bell, W6RBL
Jim Jupin, WA8MPA

FIELD DAY CHAIRMAN

Mark Graybill, W8BIT

REPORTERS

Satellites: Greg, KO6TH
History: Gary, KQ6RT
Misc Radio: Fred, K6DGW
Sunshine: Richard, WA6RWS

WEBMASTER:

Birton Gilbert, N6UG

REPEATERS

145.430 (-0.6 MHz/PL 162.2)
440.575 (+5.0 MHz/PL 162.2)
223.860 (-1.6 MHz/PL 162.2)

CLUB NET

Thursdays, 7:30PM, W6EK/R
145.430

CLUB MEETINGS

Second Friday of the month,
7:30PM at the Auburn City Hall,
1215 Lincoln Way, Auburn CA

CLUB BREAKFAST

Last Sat of the month at Mel's Diner
1730 Grass Valley Hwy, Auburn 7:30AM

NET CONTROL OPS

Dave Jenkins, WB6RBE
Norm Medland, W6AFR
Bob Brodovsky, K6UDA
Al Martin, NI2U

NEWSLETTER EDITOR

Barbara Anderson, W6EVA
anderson51@wavecable.com

ARRL PIO:

Carl A Schultz, WF6J

VOLUNTEER EXAMINER

Dave Albright, NO6NO

Calendar of Events

May 3rd:
Enduro

May 8th:
Club Meeting

May 25th:
Memorial Day 

May 30th:
Club Breakfast

May 30th:
Tour de Cure

June 27-28th:
Field Day

Inside this issue:

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- *Highlights from the Rocklin Public Safety Fair*
- *Congratulations Matthew Diridoni, KC6RUO*
- *Letter of appreciation*
- *Miscellaneous Radio – Anatomy of a Geomagnetic Storm*
- *2015 SFARC Field Day T-shirt*
- *Board & General Minutes*



We encourage members to receive Sierra Signals via email to save the Club the cost of reproduction and mailing

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From the Mic

By Tyghe Richardson – KD6MLH, President

CQ CQ CQ CQ FIELD DAY W6EK

Getting ready for field day 2015!

With a lot of new activities and events this year it is time to start looking forward to the ham radio holiday weekend that we call field day. Yes it's not until June but it is time to think about it; for some of us on the field day committee we have been thinking about field day 2015 since last July. A lot of hard work has gone into the event and it is not even June!

I expect to see every club member at Nyack this year, at least for a short visit. For all the details as to how the weekend is going to run come to the June meeting and all your questions will be answered! I will say that we already have time slots for the operation filling up and this is going to be an awesome year at the SFARC field day!

2016 and you!

As we start the 5th month of the year it is time we think about the election in November. We are going to have several openings this next year. I hope that some of you will step up and fill a seat. I would also like to ask that you all think about volunteering for a committee next year. From smaller public relations events to the ham swap we have openings with just about every level of involvement.

Please email me or the VP Bob K6UDA with your interest. If you have not volunteered before it is time!

73's for now!



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Rocklin Public Safety Fair – Saturday April 25, 2015



On Saturday April 25, 2015, SFARC hosted a booth at the Second Annual Rocklin Police and Fire Public Safety Fair. More than 15 Government and Private Safety Agencies participated in this year's event. Bruce, K6BAA and his son Alex headed up the effort with a quality display of HF and VHF gear on site with a self-contained battery operated setup. The ARRL provided Safety related Amateur Radio brochures that were handed out to folks that stopped by the booth. This was a family friendly event that SFARC was pleased to support. By Jim WA8MPA





Congratulations **Matthew Diridoni, KC6RUO**, for receiving the Professional Staff of the Year Award from the Rocklin Police Department

(Sent by email to WA6RWS)

Jim - WA8MPA,

I'm Dave Hund's daughter who was at the Hamfest on the 14th. I want to thank you and the club for the tremendous amount of help you gave to us at the sale. As you know, we didn't know anything about any of my dad's equipment and we certainly could not have sold it on our own. We could not have done the sale without you!

I know my dad would have loved being there. And, he most definitely would have appreciated your help too. So, I can't thank you and the club enough for your generous time and effort.

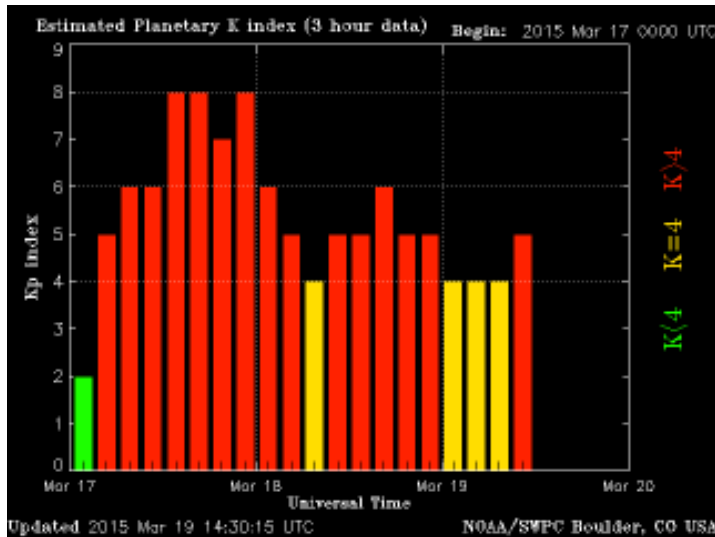
With much appreciation,
Susan



MISCELLANEOUS RADIO

Anatomy of a Geomagnetic Storm

I had something else planned for this issue but we had a rare and very large geomagnetic storm over the week of 16 March and it seemed best to shelve the plan and look at the storm instead. Storms of the magnitude of this one are very rare. I've probably seen a half-dozen in 62 years as a ham. We have a lot of new-ish hams in the club, this may be your first "big one," and we have a great deal of technical information available to us via the Internet, which of course hadn't been invented back when I was a younger ham. Then, we just listened to the signals on the bands and made surmises as to what was happening. Today we know a lot more.



It all started in the latter part of the previous week with an X.5 solar flare. For some reason, these flares tend to be more numerous and intense on the downside of a solar cycle.¹

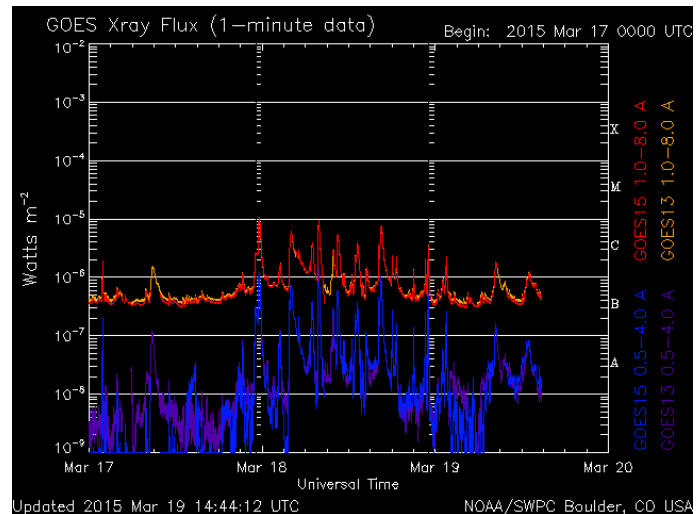
Most of the data presented here come from two GOES satellites in geosynchronous orbits, one at 75 W [75 W runs through New York and the satellite is over the western part of Ecuador] and the other at 135 W [over the Pacific north of French Polynesia] They measure x-ray flux, magnetic fields, and the density of electrons and protons. The Kp-index, plotted at left, is calculated by NOAA, more on that later.

At this altitude [~24,000 miles] they see the sun continuously, regardless of whether they're on the day or night side of the earth, except around the equinoxes when the sun is sometimes eclipsed by the earth as seen by the satellites. Most of what they measure

doesn't care about that however.

The x-ray flux is measured in watts per square meter, and is divided into several ranges. The shorter wavelength band [0.5 – 4.0 angstroms, blue and purple in the plot] normally hangs out in the first range [unnamed] or in the A-class. The longer wavelength band [1.0 – 8.0 angstroms, red and yellow] is normally in the B-class with small "flare-lets" into the C-class. That's what was happening most of Wed, 18 March.

Flares into the M-class occasionally have minor to moderate effects on HF propagation if they are accompanied by a Coronal Mass Ejection. The x-ray flare that caused all this current HF and VHF bruhaha is a couple days off the left hand edge and was in the X.5 class,² around 0.5 milliwatts/square meter. While that may not seem like a lot of energy, keep in mind that it is 0.5 mW through each and every square meter of the cross-section of the ionosphere [~254,000,000,000,000 or 2.54×10^{14} sq meters for about 1.27×10^{11} watts, continuously].

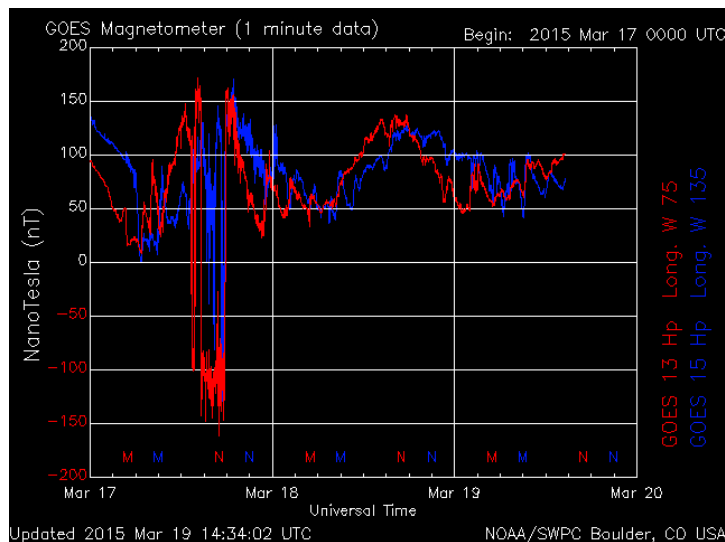


Large flares often cause massive ejections of solar material [a plasma of electrons and protons], and that mass carries the strong magnetic fields of the sunspot with it, all knotted up. If they are aimed at us, they will disrupt the Earth's magnetosphere a few days later. It's not a straight-line path however. The sun is rotating in the same direction that we orbit it, and when ejected, the plasma has that velocity component as well as an outward one. Imagine a rotating lawn

¹ Exactly why is still a bit of a mystery, but there's strong evidence it does not involve fruitcake.

² Note that the left scale is logarithmic [like S-units], each major division is 10 times the lower one.

sprinkler flinging out water. The individual water droplets follow a curved path if viewed from above the sprinkler. We are also moving. Viewed from above the plane of the solar system the plasma path is outward and gently curved, and the Earth intercepts it when it reaches our orbit.



The Earth's magnetic field loops out into space, “from” the North magnetic pole around “to” the South magnetic pole.³ If we were in space all alone, nothing around us, the field lines would form a huge bubble around the Earth.

But, we're not alone. The sun emits a steady stream of electrons and protons [hydrogen nuclei, the solar wind] at several hundred km/sec. This wind is charged and it also carries some of the sun's magnetic field. Charges moving is a current, and currents changing create and interact with magnetic fields, and the effect is to compress the sunward side of the magnetosphere, and stretch the night side out into a long tail of field lines away from the sun.

The result is that, under quiet conditions, the field measured by the GOES satellites oscillates more or less smoothly over each 24 hour day, roughly between

about +50 nT and +150 nT. NT you ask? Nanoteslas, 10^{-9} Teslas, or a billionth of a tesla. Like farads for capacitance, a tesla is a big unit. Magnets in MRI machines run in the 3 – 5 tesla range.

You can see what happened around noon PDT on St. Patrick's day. The CME and its associated magnetic fields were so strong that they pushed the sunward part of the magnetosphere inward toward the Earth, inside the geosynchronous orbit. They also happened to be oriented opposite to the Earth's field, so the satellites reported negative fields of -150 nT. These strong, oppositely oriented fields allowed millions of tons of the plasma particles to slip down the field lines toward the magnetic poles creating huge auroras. They also ionized the D-layer many times above its normal value, which ran the absorption way up and effectively killed the HF bands.

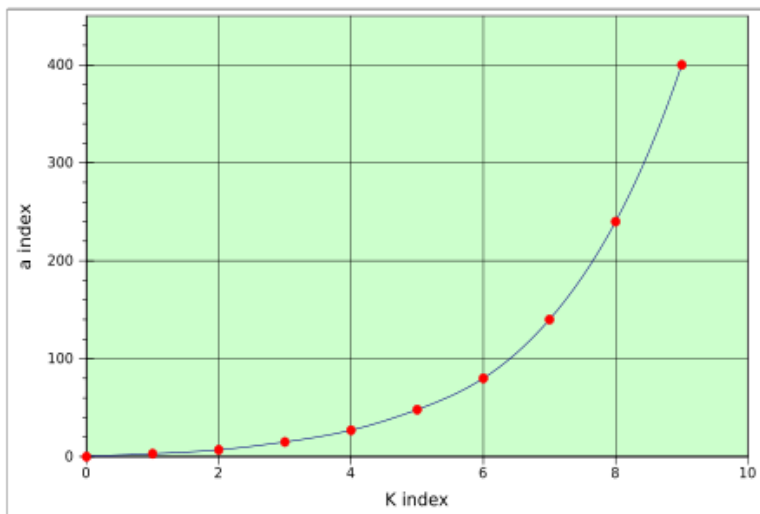
So, back to that first bar chart showing Kp over time. What is Kp? Let's start with the A index. It measures the maximum change in the horizontal component of the Earth's field over a 3 hour period. It is measured at a number of observatories around the planet. It is unbounded and can get as large as needed. On 17 March, A was over 200 for awhile, it is simply the largest excursion in the horizontal component over the 3 hour period.

K is calculated at all of these observatories as well. However, K ranges from zero to nine. Each observatory computes its own K for its latitude using a “correction factor” that depends on its latitude. Higher latitudes have larger factors. In the far north, it might take a difference of 1,500 nT between max and min to equal a K of 9. Near the equator, it may take only several hundred nT for K=9.

Kp is the planetary K index, and is the weighted average of the calculated K's from each reporting station. There are some minor complicating factors, but that's the basics.

Kp's below 3 generally signal a quiet geomagnetic field, and more or less normal HF propagation for whatever the 10 cm solar flux

a index vs. K index



³ Technically, the “north magnetic pole,” now in the high arctic [it slowly moves] is really a south pole because the north pole of magnets are attracted to it.

happens to be. If it's high, you work DX. If it's low, not so much.

Kp's of 7 and above almost always result in really disturbed HF propagation, often just dead higher frequency bands in daylight, and weak signals on lower frequency bands at night with lots of QSB. That's exactly what happened during the St. Patrick's week. On the 18th, the stations checking into the Nor Cal Traffic Net on 3533 KHz at 0200 UTC were weak and sounded like the OH's, LA's, SM's and TF's on 20 and 15, with rapid flutter.

HF propagation outages aren't the only effects of severe geomagnetic storms. The auroras they produce can create some incredible 6 and 2 meter openings. Six meters was reported open over many paths in this storm, just point your beam north-ish at the auroras.

They can also disrupt the power grids. We generally generate electricity by moving a wire through a magnetic field. The more rapidly we move it, the higher the current we produce. It really doesn't matter what moves, you can also move a magnetic field past a wire. In fact, nothing has to move, the field just has to change and the more rapidly it changes, the more current generated.⁴ Now, a 300 nT change in field strength doesn't seem like much, but looking at the magnetometer plot above, it changed back and forth very rapidly.

High voltage transmission lines are universally long. The Pacific DC Intertie [Path 65] between Sylmar in SoCal and the Columbia River in Oregon is over 1,300 miles long. It is immersed in the Earth's magnetic field for its entire length, and even a 300 nT change, if it occurs fast enough, can trip it off-line. Since it represents close to half of the overall capacity for the SoCal area, if it trips off, lights go out in Los Angeles.

As Cycle 24's solar activity declines, so will the probability and intensity of flares and CME's. If, in fact, we are entering a period of very weak or even missing solar cycles similar to the Maunder Minimum at the head end of the 18th century as is being predicted⁵, we may not see too many more of these severe geomagnetic storms. We might also see a lot of DX-ing go away.

73

Fred K6DGW

⁴ Math Dudes will tell you, "The larger the first derivative of the field strength, the larger the current."

⁵ But, "Predicting things is hard, especially if they're in the future." Y. Berra Philosopher and Catcher

2015 SFARC Field Day T-shirt

I present the 2015 SFARC Field Day T-shirt. **Contact Bob K6UDA to order.** The Cost will be \$15.00 each sizes S thru XL. Add a buck for bigger. BTW, for those wondering what that means at the bottom, it's the Grid coordinates at Nyack.

73,
Bob K6UDA
(916)871-0726
K6UDA@att.net



BOARD OF DIRECTORS MEETING MINUTES April 10, 2015

The SFARC Board meeting for April commenced at 1800 hours at the Sizzler restaurant back room in Auburn.

Roll Call: All officers and Directors were present with the exception of Robert-W6RBL. Also present were guests AI-NI2U, Dennis-WU6X, Mike-K5CWV and Orion-KK6RGT.

REPORTS and DISCUSSIONS

President's Report: Tyghe-KD6MLH began discussion on a proposal for the Club to purchase GOTA (Get On The Air) pins for field day. Additionally, Tyghe suggested club should purchase field day pins to be sold to club members who are present/and or visit the field day site in Nyack. Director Birton-N6UG made a motion for the Club to purchase the GOTA pins at \$ 6 each for a total of \$ 150. VP Bob-K6UDA seconded and the motion was unanimously adopted. Bob made a motion for the club to purchase Field Day pins to be sold to Club members. Birton seconded and the motion was unanimously adopted.

Tyghe also discussed incentives for club members to renew their membership to include a multi-year discount. Both Bob-K6UDA and Birton-N6UG agreed suggesting the dues multiyear discount at \$ 20 per year. Birton made



Continued from page 8

a motion to adopt a multiyear due fee of \$ 20, Jim-WA8MPA seconded and the motion was unanimously adopted.

VP Report: Bob-K6UDA suggested the Club should adopt a Life Membership especially after contributions, dedication and hard work some individuals have demonstrated to the club and the amateur community. Birton added life membership is usually for years of service and dedication. Birton further suggested that the bylaws should be updated to include life membership rules and qualifications. Tyghe instructed Club Secretary Bruce-K6BAA, to research and draft a life membership bylaw.

Secretary's Report: Bruce-K6BAA advised the board that a letter and follow up telephone call was made to Grant Wells of Nyack confirming the Club's use of the Nyack site for field day.

Treasurer's Report: Richard-WA6RWS reported net cash on hand at beginning of March of \$8194.13; deposits of \$2802.42 with an ending balance of \$9186.16. Richard added Club memberships now stand at 116.

Repeater: Richard – WA6RWS suggested a membership poll on future repeater functions/options.

OTHER DISCUSSIONS

Director Birton-N6UG presented to the Board the final draft of the Social Media policy to be added to the Clubs bylaws. Bob-K6UDA made a motion to adopt the final draft, Richard-WA6RWS seconded and the motion was unanimously adopted.

Meeting adjourned at 1900. Submitted by Bruce-K6BAA, Club Secretary

GENERAL MEETING MINUTES April 10, 2015



The SFARC General meeting for April commenced at 1930 hours at the Auburn City Hall Rose Room, President Tyghe-KD6MLH presiding. All Officers and Directors were present with the exception of Robert-W6RBL. Tyghe led approximately 45 members and guests in a Pledge of Allegiance to the flag followed by an introduction of Officers, members and guests.

REPORTS:

Past minutes: Minutes were approved as posted in the Newsletter on motion.

President's Report: Tyghe briefly discussed the agenda. Tyghe reviewed this evening's board meeting to include multiyear membership discounts, GOTA pins and field day pin sales. He then called for Officers' reports.

VP's Report: Bob-K6UDA advised the board was working on a life membership and sustaining member designations and asked for volunteers for his field day feature length video project. Bob also reviewed last month's swap meet.

Secretary's Report: Bruce-K6BAA requested input for the club newsletter; a Welcome letter available for new members and guests, and a reminder to the membership to sign the attendance sheet.

Treasurer's Report: Richard-WA6RWS reported net cash on hand at the beginning of March of \$8194.13; \$2802.42 in deposits and a balance of \$9186.16. Richard added Club memberships now stand at 116.

VE's Report: Dave-NO6NO, VE reported 15 elements were given to 11 candidates resulting in 5 new techs and 5 new generals.

Repeater Report: Richard-WA6RWS advised all 3 repeaters are linked together. The talkback function is having



Continued from page 9

issues and the new controller had arrived and will soon be installed.

Sunshine Report: Richard-WA6RWS told the membership SK John Webb's radio equipment will be sold with Ron-NC6U coordinating with the family. Club members will be given first opportunity to buy the equipment and a list will be published soon.

Refreshments/Drawing: Dave-NO6NO reviewed items planned for the drawing. Scott-K6SVW reported on refreshments for the break.

ARES: There will be a meeting on April 25th at the Auburn Veteran's Hall. Jim-N6MED advised the membership of a Red Cross exercise to take place next week.

Yahoo Group: Dennis-WU6X, administrator for the Yahoo Group Site, gave the membership an overview and advised he would be programming Baofeng radios during the break.

Web Master: Carl-WF6J introduced Director Birton-N6UG as the new club web master.

OLD BUSINESS:

Field Day 2015: Bob-K6UDA advised members there will be an antenna set up and test exercise at his QTH on Sunday April 12th.

NEW BUSINESS:

Committees: President Tyghe announced to the membership that a volunteer is needed to chair next year's swap meet.

General Announcements: The Club Net meets every Thursday at 7:30pm; Board and General Meetings occur on the 2nd Friday, Board meeting is held at **Sizzler Restaurant** in Auburn, and General meetings at 7:30pm at **Auburn City Hall**. The Club breakfast is held on the last Saturday at **Mel's Diner** in Auburn; an Elmer Net is held the first and third Wednesday night at 7:30pm on the 2m repeater. See www.w6ek.org for more information.

Tech-10 & Presentation: The Tech-10 was presented by Rich Andrus-KJ6MOT who conducted an extensive discussion on the Sweep Riders and their role in supporting events while horseback. He asked for volunteers to assist his teams with pre-ride communications.

The meeting adjourned at 2100. Submitted by Bruce-K6BAA, Club Secretary



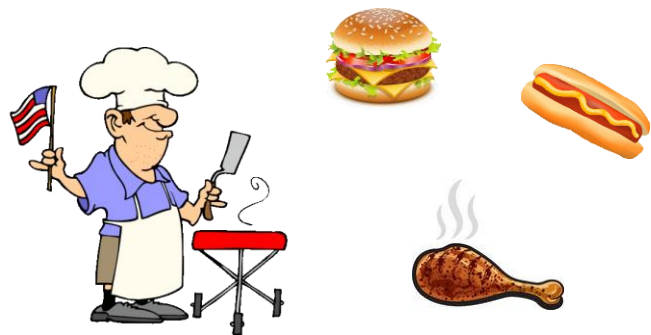
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2015 MEMBERSHIP APPLICATION

Name: _____ Call: _____ Class: _____ e-mail: _____
Address: _____ City: _____ State: _____ Zip: _____
Associate Name: _____ Call: _____ Class: _____ email: _____
Phone: _____ Cellphone: _____ Application is: (Circle) New Renewal

Dues / Donations:

| | | | | |
|----------------------|----------|---------------------|--|------------------------------|
| Membership: yearly* | \$ 22.00 | Name Badge: | \$ 7.00 | Yes (special name)_____ |
| Associate: yearly* | \$ 7.00 | Repeater Donation: | \$ _____ | |
| Auto Patch Donation: | \$ _____ | Newsletter Booster: | \$ _____ | |
| Misc. Donation: | \$ _____ | Christmas Donation: | \$ _____ | ARRL member? (circle) Yes No |
| TOTAL: | | \$ _____ | Please add \$1 if paying via PayPal | |

*Prorated dues for NEW Members/Associates Only

| | | | |
|-----------|---------|----------|--------------------------|
| July | \$ 20/6 | October | \$ 14/3 + following year |
| August | \$ 18/5 | November | \$ 12/2+ following year |
| September | \$ 16/4 | December | \$ 10/1 + following year |

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